Unit: Cellular Respiration and Photosynthesis

**Concept 1: Analyzing the Processes of Cellular Respiration**

*Concept 1: You Must Know….*

🡪The summary equation of cellular respiration.

🡪The difference between fermentation and cellular respiration.

🡪The role of **glycolysis** in oxidizing glucose to two molecules of pyruvate

🡪The process that brings pyruvate from the cytosol into the mitochondria and introduces it into the **citric acid cycle**

🡪How the process of **chemiosmosis** utilizes the **electrons** from NADH and FADH2 to produce ATP

How is cellular metabolism relevant to higher levels of biological organization: physiology (breathing, digestion), ecology (communities)?



Cellular Respiration



**Catabolic** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ complex molecules into smaller ones

**Exergonic** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that can be used to do work (such as build ATP from ADP and Pi)

*There are 2 catabolic pathways that you need to know:*

**Fermentation** - the partial degradation of sugars that occurs ­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the use of oxygen

**Cellular Respiration** - the most prevalent and efficient catabolic pathway.  It is also called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ since oxygen is required as fuel.

Your mitochondria use a series of controlled steps, releasing energy in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at a time

* Some energy is still lost as heat
* The rest is converted to chemical energy in ATP for use in the cell
* This is done through a series of Redox reactions

**Reduction/Oxidation Reactions**

Redox Reactions - Follows the movement of ELECTRONS from one chemical to another



“X” is \_\_\_\_\_\_\_\_\_\_\_\_ electrons

“Y” is \_\_\_\_\_\_\_\_\_\_\_\_ electrons

**Redox and Cellular Respiration:**



**Electron Carriers**

* NAD+ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electron carrier (nicotinamide adenine dinucleotide – a derivative of the vitamin niacin)

NAD+  + 2e - + H+ produces NADH So….is NAD+  reduced or oxidized?

* FAD, a coenzyme \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. FAD + 2e - + 2H + produces FADH2

**An Overview of Cellular Respiration:** Cellular respiration has three stages

1. Glycolysis (breaks down glucose into two molecules of pyruvate)
2. The citric acid cycle (completes the breakdown of glucose)
3. Oxidative phosphorylation (accounts for most of the ATP synthesis)

